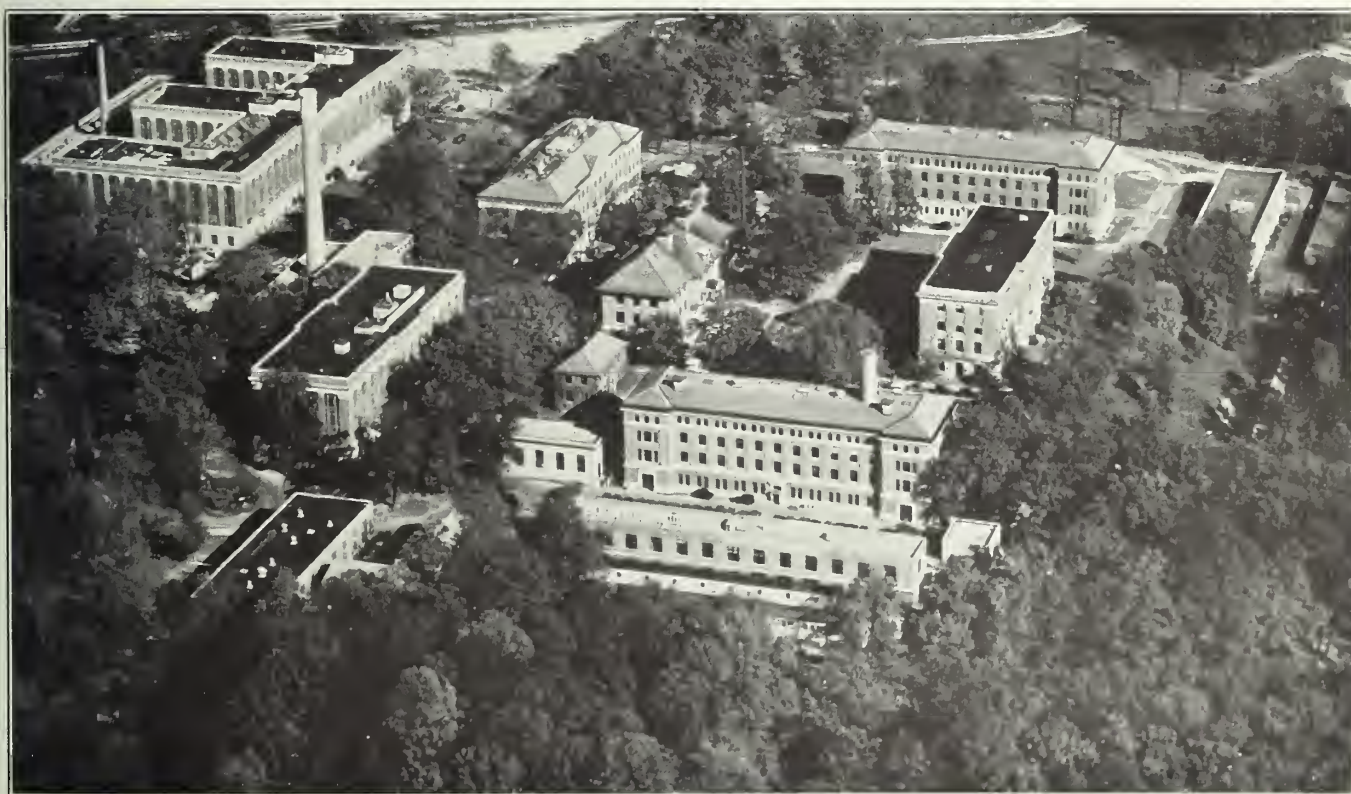


COMMERCIAL STANDARDS MONTHLY



*A Review of Progress in
Commercial Standardization and Simplification*



AIRPLANE VIEW OF NATIONAL BUREAU OF STANDARDS

ISSUED BY THE NATIONAL BUREAU OF STANDARDS OF THE
U. S. DEPARTMENT OF COMMERCE ~ ~ ~ ~ WASHINGTON, D. C., U. S. A.

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UNITED STATES DEPARTMENT OF COMMERCE

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DIVISIONS OF THE COMMERCIAL STANDARDIZATION GROUP

DIVISION OF SIMPLIFIED PRACTICE, EDWIN W. ELY.

The division of simplified practice was formed in November, 1921, to provide a clearing house or centralizing agency through which the manufacturer, distributor, and consumer groups could meet to discuss their common problems and decide upon eliminations which would prove of mutual benefit to all concerned. The activities of the division are purely cooperative in character. It orders nothing; it dictates nothing; the initiative must come from business itself. It has no regulatory nor police powers to enforce adherence to the simplified-practice recommendations that industry develops under the auspices of the United States Department of Commerce. Its chief function is to serve as a neutral meeting ground for the purpose of bringing together producers, distributors, and consumers, whose aims are sometimes divergent and possibly antagonistic, and who would be unwilling to cooperate, except through some unbiased central agency. Following the approval of the tentative simplified-practice recommendation by a general conference of all interested elements thereof, the project is then presented to the entire industry by letter referendum for its approval and written acceptance, the publication and indorsement of the recommendation on the part of the Department of Commerce being dependent upon acceptance of the program by at least 80 per cent, by volume, of the manufacturers, distributors, and users concerned.

AMERICAN MARINE STANDARDS COM'TEE, A. V. BOUILLON.

The American Marine Standards Committee was organized to promote simplification of practice and elimination of waste in the marine and allied industries. It is composed of individuals, corporations, societies, Government departments, public bodies, or other organizations or groups engaged in building or operating ships, port facilities, and related activities. It works in close cooperation with official agencies, but its activities are controlled by an executive board elected annually by and from the membership. For further information, write direct to the secretary, A. V. Bouillon, Room 713, Department of Commerce, Washington, D. C.

DIVISION OF TRADE STANDARDS, I. J. FAIRCHILD.

The commercial standards unit, now known as division of trade standards, was created on October 1, 1927, for the purpose of aiding those industrial and commercial groups desiring to establish standards of grades, quality, or measurements for their products or their purchases on a purely voluntary basis.

The division functions only at the direct request of the industry concerned. Its procedure is similar to that of the division of simplified practice, except that at least 65 per cent of the industry, by volume of annual production, must accept the commercial standard in writing before it is published by the Department of Commerce. A certification plan is applied

DIVISION OF TRADE STANDARDS—Continued.

on request as a means of increasing the effectiveness of such standards. Provision is made for regular revision of the standard through the appointment of a standing committee to consider periodically any necessity for revision of the standard, in order that it may be kept constantly compatible with progress in the industry.

DIVISION OF SPECIFICATIONS, A. S. McALLISTER.

The duties of the division of specifications are to promote and facilitate the use and unification of specifications. In doing so it carries on activities involving cooperation with technical societies; trade associations; Federal, State, and municipal Government specifications making and using agencies; producers, distributors, and consumers; and testing and research laboratories. The cooperation with technical societies and trade associations includes ascertaining the standardization and specification promoting activities of these organizations, and bringing to their attention the work being done by the commercial standardization group. The cooperation with producers involves the compilation of lists of manufacturers who have expressed their willingness to certify to purchasers, upon request, that material supplied by them on contracts based on certain Federal specifications or commercial standards comply with the requirements thereof. The division prepares the directories of governmental and nongovernmental testing laboratories; the Directory of Specifications; and is working on an encyclopedia of specifications, the first volume of which, Standards and Specifications in the Wood-Using Industries, has been issued. It also aids in preparing the Standards Year-book.

BUILDING AND HOUSING DIVISION, J. S. TAYLOR.

The division of building and housing cooperates with business, technical, and professional groups in practically all its undertakings on building and housing. Its work to modernize building codes and to encourage improved standards for the quality of building construction promotes the practical application of the latest development in design and use of building materials. This division was also formed in 1921.

In furthering home ownership, an effort is made to develop an enlarged, steadier, more intelligent, and more discriminating demand for soundly built dwellings, the largest single class of buildings which the construction industries provide. The division also cooperates with many business and professional groups in efforts to distribute building activity more evenly throughout the year, and to secure less fluctuation from year to year. The work on city planning and zoning has in mind the broad objective of buildings made more useful because well located with respect to other buildings, a well-coordinated street system, and appropriate public works. Good city planning and zoning likewise encourages stability in land values and property uses, and thereby contributes to the demand for durable structures.

Except where otherwise indicated, for further information address

BUREAU OF STANDARDS

WASHINGTON, D. C.

COMMERCIAL STANDARDS MONTHLY

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NUMBER 3

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AN INVITATION TO VISIT THE BUREAU OF STANDARDS

An interesting fact in the growth of the bureau is the steady increase in the number of visitors. From all over the world experts come to see the work in progress in many specialties. Not alone the experts but in growing numbers many of our people visit the bureau from a public-spirited desire to acquaint themselves with its research work. All visitors, from the newspapermen, who have called the bureau a "house of wonders," to the specialists, who use its services, are welcome, for it is their bureau in a very real sense. They are the owners of the business and its beneficiaries. The annual per capita cost of 2 cents which the average citizen pays toward the operation of the bureau yields returns sometimes a hundredfold or a thousandfold. How science turns wastes into profits, increases the useful life of materials, adds new efficiencies to industry, advances new arts, such as aviation and radio, by research and discovery—these are to be seen first hand in the scientific and technical laboratories of the bureau.

A cordial invitation is extended to all citizens interested in scientific progress to visit the laboratories of the Bureau of Standards when in Washington. A personally conducted trip is organized at 2.15 p. m. daily except on holidays. Special trips for groups may be arranged at other times by writing to the bureau in advance. The bureau's illustrated Visitor's Manual may be had for the asking. This lists the work in progress and gives an airplane view of the ensemble and a brief statement of typical discoveries and inventions which have been notable, basic contributions to radio, aviation, and other modern arts and industries.

GEORGE K. BURGESS, *Director.*

REGIONAL APPROACH TO NATIONAL SIMPLIFIED PRACTICE RECOMMENDATIONS



INDUSTRY and commerce make their profits chiefly through the successful manufacture and distribution of commodities and through the use of certain articles to produce certain gainful results. The primary function of the division of simplified practice is to assist individuals and groups which are in any way concerned with a given product to reduce the cost of manufacturing and distributing that product. In order to secure maximum results, such problems should be handled on a national scale.

There are certain problems, however, notably in connection with natural products, which can not be effectively handled on a national scale until they have been successfully solved within a limited area or region. Slate, a natural rock, not subject to the precise control that governs fabricated materials, exemplifies this class of product. Some aspects of such a problem may always be regional, as, for example, the color in slate. In certain other aspects, identical characteristics may be found in other regions, and in such cases the regional solutions may prove to be nationally applicable.

A regional program may be the source of a national simplified practice recommendation, but it should never be construed as a local interpretation of a national program. Such interpretation might place communities in destructive competition with one another. A simplification program covering one region may become nationally known at once, or it may stimulate the development of similar programs in other regions which may eventually be merged into a single national program.

In the case of high-volatile bituminous coal handled over the docks at the American head of the Great Lakes, a regional program was successfully developed. Coal interests in other regions are considering similar programs in their own fields. It seems probable that a "common denominator" will materialize which may form the basis of a national program of major importance. The division regards this project as a valuable test case, and has therefore cooperated with the coal industry to develop and promulgate Regional Recommendation No. 1.

APPLICATION OF LABORATORY METHODS TO THE ART OF FLYING

WIND TUNNEL IMPORTANT FACTOR.

Flight by man is usually listed among the wonders of the twentieth century, but the wonder is gradually disappearing as airplanes become more numerous and commercially organized air services take their place alongside the railroad and automobile lines as carriers of mail, freight, and passengers.

It was not over 25 years ago that the art of human flight became an accomplished fact through the culmination of the work of Wilbur and Orville Wright. The victory over the unknown forces of nature followed after a long siege dating back centuries to men who lived so long ago that their attempts to fly are remembered only as legends. Bit by bit knowledge was accumulated, but at the price of human life. The victory came suddenly like the collapse of the camel's back when the famous last straw was added to the load. What was the last straw by which the air was conquered?

Some say that the deciding factor was the development of a gasoline engine of large power and small weight, but the near success of Langley with his steam engine shows quite clearly that this is not the real explanation. It is believed that the deciding factor was the development by Langley, Wright, and others of an experimental procedure using small models; experiments which could be made at so much less expense and so much more quickly and accurately, without risk of human life.

EARLY TESTS.

The same factor operated in the rapid development of other wonders of the twentieth century. The first automobile was built by adding an engine, transmission, and steering gear to a horse-drawn buggy, and in its early development the effects of all suggested improvements were tried on the complete automobile. To-day this type of test is supplemented and in many cases replaced by laboratory tests of the separate parts under conditions designed to represent those occurring in automobile driving.

Early airplanes were constructed full size, and tests made by pushing them over the edge of a roof or sending them down an inclined track. To-day the airplane is first tested in two ways. First, all of the parts are tested and checked for structural strength, and the assembled machine tested by loading with sand and by dropping it to the ground from a given height. In the second place, the loads to be encountered and the stability and control are measured by the use of small models. For example, when the Select Committee of Inquiry of the House of Representatives conducted its investigation into the state of the air services, a few years ago, many questions were settled by tests of small models of airplanes at the Bureau of Standards, Langley Field, Va., the Washington Navy Yard, and elsewhere. The results of these tests were published in a separate technical volume accompanying the general testimony. The Safe Code for Commercial Aviation, worked out under sponsorship of the Bureau of Standards and the Society of Automotive Engineers by representatives of all groups interested in civil aviation requires that model tests be made of all essentially new designs.

TESTED IN WIND TUNNEL.

The models are tested in a device known as a wind tunnel, which consists of a long tube of fairly large

diameter through which air may be drawn at high speeds by means of a fan. The miniature airplane is held fixed in the air stream by means of wires which are attached to balances for measuring the forces produced by the wind. Just as when moving in an automobile a wind is felt, so in an airplane the pilot and passengers, if unprotected, feel a strong wind, even when the airplane moves in still air. It happens that the forces on an airplane driven through still air by a propeller at a certain speed are exactly the same as if a wind were blown at the same speed against the airplane while held at rest. The laws of variation with size can be determined by using models of different scale so that the air forces on a model at rest in a high wind can be used to predict the forces on an airplane moving through still air at the speed of the wind. By a suitable arrangement of the supporting wires and the balances both the lifting force and the resistance which must be overcome by the propeller can be measured. Likewise, the stability may be determined—that is, whether the airplane will tend to remain in even, steady flight when disturbed by wind gusts.

THREE TUNNELS AT BUREAU.

There are three such wind tunnels at the Bureau of Standards, one 3 feet in diameter where winds up to 150 miles per hour can be produced, one 4½ feet in diameter where winds up to 75 miles per hour may be secured, and one 10 feet in diameter where winds up to 70 miles per hour can be produced. This last tunnel is one of the largest in the world. A 70-mile per hour natural windstorm causes great property damage and usually loss of life. This 10-foot diameter artificial stream is, of course, controlled, and it can be instantly stopped and started and its intensity varied at will.

There are many interesting illustrations of the value of these laboratory tests. During the war a large 7-winged airplane consisting of three main wings one above the other and a pair of wings in front and a pair behind was built without a model test by a designer who secured funds from private sources. On its trial flight the airplane met with an accident, the nose lifting in the air and the machine falling back on its tail as soon as the full motor power was turned on. The designer was then persuaded to make a model for wind-tunnel tests at a cost, (including the tests), of perhaps one two-hundredth that of the full-scale machine. The wind-tunnel test showed that the air forces were not properly balanced with relation to the weights carried and certain changes were suggested. It was found impossible to carry these out on the actual machine without practically rebuilding it. A partial rebuilding was carried out at great expense, but the second attempt at flight resulted in a second wreck. The financial backing was withdrawn and the project was abandoned with no return on the money spent. Had the wind-tunnel test been made first the project would probably have been carried through to completion, since the suggested changes could readily have been made in the original plans.

PERFORMANCE OF AIRCRAFT PREDICTED.

The performance of an airplane, so far as speed, climbing rate, etc., are concerned, can be predicted with amazing accuracy from wind-tunnel tests by a

competent engineer. Certain secondary corrections need to be applied for best results. Many people are surprised to learn that after the initial climb when the airplane remains nearly at the same height above the ground no power is required directly to stay up. It is necessary to keep moving forward to stay up and this requires power to overcome the air resistance. The force required to be exerted is, however, only one-eighth the weight lifted, a great advantage over a helicopter where a force equal to the weight must be provided by the propeller. Since moving forward to get somewhere and not merely to stay up is usually the main purpose of flight, all the power is spent in the useful task of getting somewhere. The power required does not compare at all unfavorably with that required in an automobile traveling over the ground at the same speed. In an automobile traveling at about one-half the speed of an airplane, only one-eighth the power is required, since at high speeds the automobile also spends nearly all its power in overcoming air resistance, the necessary power varying as the cube of the speed.

USED ARTIFICIAL WIND.

Wind tunnels as we know them now are a comparatively recent development, but similar though less exact methods were used by Langley and the Wright brothers and their contemporaries. Sometimes the wind was simply the natural wind, which is very unsteady and varies in direction rapidly. Sometimes the wind was an artificial wind through a small pipe, but at any rate it was by experiment on a small scale checked by experiments on a larger scale in gliders that the air was finally conquered. By measurements on small, thin plates the advantages of curved wings over flat wings were discovered and the problems of balance and stability were partially solved without risk of life. For this reason it is believed that the application of model measurements was the decisive factor in expediting the conquest of the air. The wind tunnel has found application in many ways. A person walking, an automobile, or a train must overcome air resistance. In the case of a person walking rather fast, the force is only a few ounces unless in a high wind where several pounds are readily perceptible. In the case of the automobile, the maximum speed is practically fixed by the air resistance, and even at 30 miles per hour some four horsepower is expended in overcoming air resistance. A few wind-tunnel measurements have been made on automobiles, and in Europe where gasoline is high some automobiles are designed to have low air resistance. They appear very strange in comparison with our conventional designs. The design of racing automobiles can be materially improved by wind tunnel experiments.

NEED OF MINING STANDARDS

No one who has observed the phenomenal progress of the automobile industry can fail to recognize standardization as the prime factor in that progress. The motor-car industry is foremost in the use of standard designs, materials, and practices and makes a most impressive showing in respect to initiative and improved design—the two qualities to which standardization often is regarded as inimical, comments the Mining Congress Journal, in discussing the need of mining standards.

According to its leaders, the mining industry must do likewise. It can not accept the superficial view that standardization is synonymous with stagnation. A view of the automobile industry in retrospect will disclose the fact that the simplest bolt for the simplest part formerly cost from 15 to 20 cents and the nut for it an equal sum; this price is about seven or eight times the present price for the same articles and is based upon the fact that the original manufacturer was the only one producing them in the proper dimensions and of the right materials.

STANDARDIZATION MEANS ECONOMIES.

Standardization of mine-track equipment in such items as frogs, switches, guard rails, spikes, plates, and ties; standardization of the salient features of design and materials of construction of mine cars; recommendations for standard practice in the ventilation of mines; the drainage of mines and the installation of underground electrical equipment are several of the standardization projects being promulgated by the American Mining Congress.

From the standpoints of economy, safety, and service these and the other standardization activities of this organization unquestionably will result in immeasurable benefits. The economies to be gained by the use of standard equipment need no elaboration; those to be gained by standard practices are more and more being recognized as important to the efficiency of the workman employed and the operation of the equipment used. The paramount issue of safety for the men underground can not be better served than by the widespread use of standard practices which are recommended by committees composed of engineers whose study and research have indicated preferred ways of performing various operations. Service from the manufacturer in the supply of equipment demanded in odd sizes, shapes, and types of construction is a thing that can not be expected. Standard items of equipment can be manufactured in quantity and carried in stock for immediate shipment to the mines; and where store facilities are maintained at the mine, the capital invested can be greatly reduced by the elimination of unnecessary varieties now stocked.

NEWS FROM DIVISION OF SIMPLIFIED PRACTICE

The division reports on many projects under study for simplification. For the first time the *COMMERCIAL STANDARDS MONTHLY* reports on projects that have been suggested to the division.

WHAT IS SIMPLIFIED PRACTICE?

Simplified practice is a method of eliminating superfluous variety. It is applied by the collective action of producers, distributors, and consumers, with the cooperation of the division of simplified practice, to

eliminate needless variety in sizes, dimensions, and types of commonplace commodities. This method is based on the sensible avoidance of waste caused by excessive and uneconomic diversity. Simplified practice decreases costs and increases the utility and efficiency of production, distribution, and consumption. These ends are accomplished by voluntarily limiting varieties of stock items to those for which there is a consistent demand.

INDUSTRIAL CASTERS.

A partial survey has been made up and tabulated from figures furnished by 18 caster manufacturers, showing the existing diversity in over-all height, bolt diameter, and bolt-hole spacing for top connections in casters of nominal sizes, ranging from 2 to 6 inches, inclusive. The tabulation has been sent out to all manufacturers of casters in this class, also to a considerable number of users who have inquired regarding the possibilities for simplification. A second conference of manufacturers is expected to be arranged during this month, at which the matter may be discussed in the light of information developed since the first conference on April 12, 1929. Users of large industrial casters are displaying a steadily increasing interest in this project, and strongly favor an effort to bring about greater interchangeability between casters of different makes.

SINGLE TREES.

Manufacturers of this equipment have formulated a list of standard sizes and types of singletrees, which represents a very material reduction in the number formerly catalogued as standard. The Singletree Institute has suggested that the division of simplified practice call a general conference of manufacturers, distributors, and users during the latter part of September or early in October for the purpose of presenting the simplified list for approval by all interests.

CRUSHED STONE.

The board of directors of the National Crushed Stone Association voted at a recent meeting to request the division of simplified practice to cooperate with that association in developing a simplified list of sizes. The association is undertaking to secure from its members all necessary data for preparing such a list, and expects to make a study of "screened equivalents," in order to have some nationally recognized standards of equivalent size as between round-hole and square-mesh screens. This project will involve a very large amount of study and the collection of a great quantity of detailed information, but in the opinion of those most directly interested, will greatly benefit not only the manufacturers but all users.

SCREW JACKS.

The division of simplified practice has for several months been corresponding with manufacturers of mechanical lifting jacks in order to get their opinions in regard to the possibility of reducing the present variety of sizes and types. A large proportion of the manufacturers favor such an effort, and it is expected that a preliminary conference of manufacturers will be arranged during the next month. Users of this equipment are also showing considerable interest in the matter, and the division expects to cooperate with all parties interested in the formulation and adoption of a simplified schedule.

CAN SIZES.

A meeting of the simplified practice committee of the National Cannery Association was held in Chicago last month. At this meeting a tentative list of recommended sizes of cans for packing fruits and vegetables was drafted. The list provides for a considerable reduction in number of sizes in use to-day, although it is felt that the recommended sizes will meet the requirements of the large majority of ordinary demand.

SHOE CORING.

A general conference was held in New York on July 23 at which time the tentative proposal of the simplified practice committee for simplifying this commodity was approved. The report of the conference, which includes the schedule adopted, has been mailed to those interested for acceptance.

RESTAURANT GUEST CHECKS.

The simplified practice committee of manufacturers of restaurant guest checks has submitted a tentative proposal with the request that the division organize a general conference of all interests in September for the purpose of securing the approval of those interested.

PACKAGING OF FLASH-LIGHT BATTERIES.

The division is making a survey of manufacturers to determine their attitude toward simplification of packaging of these batteries. Twenty-four manufacturers were circularized, and, from the 18 replies received to date, it would appear that the majority are in favor of the proposal. Many of the manufacturers now package in accordance with the proposed schedule, and most of the others are willing to change their practice.

RUBBER FLOOR TILES.

The structural service department of the American Institute of Architects has suggested the opportunity for simplification of sizes, thicknesses, etc., of these tiles. Their suggestion is based on the result of tests made by the Bureau of Standards. We are now circularizing 15 of the most important manufacturers of this product to find out their opinion on the need for this simplification. If sufficient interest is shown in the project, the division will organize a preliminary conference to discuss the details.

GUMMED TAPE.

A committee of the industry has drafted a tentative proposal for this commodity, and the division has been requested to plan a general conference of all interests, to be held in Chicago during October.

SHOE CARTON SIZES.

At the request of a shoe manufacturers association, the division will, in the near future, address an inquiry to all concerned regarding the need for simplifying shoe carton sizes.

PHOTOGRAPHIC PAPER.

The printed recommendation for photographic paper is now available and may be secured from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 10 cents per copy. The title of this document is S. P. R. No. R98-29. The recommendation covers cut and roll sizes of photographic paper, and was accepted by a large volume of the industry.

CARBONATED-BEVERAGE BOTTLES.

A variety survey has just been completed by the division of simplified practice, and a consolidated report showing the percentage of production on the different heights, diameters, capacities, etc., is now being completed. This survey was made at the request of the joint simplified practice committee, made up of representatives of the carbonated-beverage industry and the bottle manufacturers, and the report will be discussed at a meeting of the joint

committee, to be held at the Department of Commerce on September 16, with the view of developing a tentative simplified practice recommendation for consideration at a general conference of all interests to be held in Atlantic City in November, in conjunction with the annual convention of the American Bottlers of Carbonated Beverages.

BUFFING WHEELS.

At the request of the simplified practice committee of the buffing-wheel industry, the division made a preliminary survey among a large number of users of buffing wheels to ascertain their views regarding the proposed standardization of buffing-wheel diameters. Many replies have been received, and practically all are in hearty accord with the efforts of the committee toward the establishment of standard sizes. The 4, 5, 6, 7, 8, 11, 14, 17, and 20 inch diameters are recommended by the simplified practice committee for adoption as standards for stock items. The investigations of the committee brought out the fact that standardization of certain diameters would result in a marked elimination of wasteful cutting of sheeting out of which buffs are made. The division is arranging for a general conference of all interests to be held late this fall for the purpose of adopting a definite recommendation covering standard diameters for buffs.

HOLES IN STEAM TABLES.

A few weeks ago the division received a communication from a representative of the metal-ware industry calling attention to the need for standardization of the dimensions of holes in steam tables. There seem to be two sets of dimensions, those in the East being slightly different from those in the West. This condition has resulted in considerable confusion in the purchase and manufacture of metal ware and other ware used in steam tables. A preliminary survey has developed the fact that the manufacturers of steam tables are in favor of the adoption of standard sizes for holes in steam tables. The division will arrange for a preliminary conference on the subject in the near future, at which time a simplified practice committee will be appointed to conduct a survey, and from the results obtained work out a tentative recommendation for the consideration of all concerned.

SUGGESTIONS.

The division of simplified practice receives many suggestions for simplification. A few of these are listed below. Manufacturers, distributors, and users of these commodities are invited to submit any comments which will be helpful in determining the interested industry's attitude toward these suggestions.

Paper board.—This commodity is used in the manufacture of paper boxes and cartons. The apparent need for simplification is in the size of rolls produced at the mills and the size of the cores.

Feather pillows.—Reduction in the number of sizes now manufactured has been suggested.

Blue-print paper.—The need for reducing sizes of rolls, weights of paper, etc., has been suggested.

Bright wire goods.—Several suggestions have been received for simplifying screw hooks, screw eyes, wire hooks and eyes, and other items making up this line.

Widths of fabrics.—Dress goods of cotton, silk, wool, and rayon are produced in many widths, and it has been suggested that the number of widths could be reduced with benefit to all concerned.

Hosiery colors.—Manufacturers, distributors, and users are requested to express an opinion on uniform terminology for the different shades of hosiery colors. One store believes that there are as many beige shades as there are manufacturers.

Lunch, cafeteria, and soda-fountain counters.—A letter was received recently from a manufacturer of counters asking if we would undertake an investigation in the interest of simplification of styles, types, and sizes of lunch, cafeteria, and soda-fountain counters.

Baking ovens.—A large concern engaged in the manufacture of pyrex ware is interested in the standardization of oven sizes, both in the kitchen range and for the baking equipment used in hotels, restaurants, hospitals, etc.

Serving trays.—The home-economics adviser of a large concern engaged in the manufacture of glassware is interested in the standardization of the size and material of trays used in institutions, such as cafeterias, restaurants, and hospitals.

Coffee containers—folding boxes.—A representative of one of the paper container associations has asked the cooperation of the division in the development and promulgation of a simplified practice recommendation covering sizes of folding boxes used in packing coffee for retail.

Meshed wire fabric for reinforcing highways.—A manufacturer of machinery for making wire from steel ingots has drawn attention to the diversification existing to-day in the wire and mesh sizes of meshed wire fabric for reinforcing highways.

Steel office furniture.—A prominent national association has suggested that a standard shade of "olive green" and standard over-all dimensions for steel office furniture would materially assist in arranging and maintaining well appearing offices and would, further, enable the user to procure quicker replacement or additional equipment to match.

1928 COMMERCE YEARBOOK OUT

During 1928 American business reached the highest level ever attained, according to the 1928 Commerce Yearbook, which is now on sale at the Government Printing Office, Washington, D. C., at \$1 per copy. The prosperity characteristic of every year since 1921 continued through last year, the yearbook states, marking the steadily increasing efficiency of both industry and trade. The only slow-down since 1921 came toward the end of 1927, but business promptly went back to a normal basis and remained that way throughout 1928.

TOUCH FOUR PHASES.

Four phases of America's industrial life touched upon in the yearbook and their performances during the year just ended were: Manufacturing output, the most comprehensive measure of economic activity, was 3 per cent above the previous peak of 1926. Mineral output, chiefly because of smaller coal production, was slightly less than in 1926 or 1927. Tonnage of railway traffic increased slightly, and on account of reduced operating expenses the net operating income of the railways was 10 per cent greater than in 1927. Export trade increased 5½ per cent in value and in quantitative terms was greater than even during the abnormal war years.

SMALL-HOUSE SURVEY

Preliminary conclusions from the small-house survey recently conducted by the Division of Building and Housing of the Bureau of Standards in 31 cities show a great variety in house details and prices per cubic foot. This survey covered 400 items of small dwelling design, construction, and equipment, and is based on inspection of houses and interviews with builders in principal cities of the United States. No previous systematic study of these details is believed to have been made on any such scale, and the results are such as to be of interest both to the general public and to business groups.

The room areas in representative houses studied have been computed, and the cubic contents of a large number of houses have been determined. These data and prices asked have been used in figuring the selling price per cubic foot after deductions have been made for value of land and garages.

Cubic contents are figured on the basis of the entire volume of the house and one-half the volume of porches. The net selling price of the house is then divided by the cubic contents to obtain the price per cubic foot. This varies from 15 cents for a low-priced house in Dallas, Tex., to 46 cents for a Washington, D. C., semidetached house. Another low-price house in Dallas sells for 27 cents per cubic foot. A Kansas City bungalow sells for 30 cents, the same price as a small Philadelphia row house, while a representative Philadelphia row house sells for 24 cents. This is merely an indication of the price ranges found,

and does not represent an equivalent variation in purchasing power as the houses mentioned vary greatly in details. The report will show how these details vary.

Preliminary figures from the survey indicate that the kitchen size of houses studied, mainly of five and six rooms, seems to be more nearly independent of any relation to price than any other room size. The usual kitchen is about 8 feet 10 inches by 11 feet 8 inches and contains 103 square feet. In a few cities—for example, Kansas City and Dallas—the kitchens are smaller, but in these cases there is usually a separate breakfast room. This is also true in Fort Worth, Los Angeles, and San Francisco.

The dining room is nearly square in most houses and the average size in houses studied is 148 square feet. Omission of a portion of the basement is unusual except in warmer climates. In Oklahoma City, where houses with basements were exceptional, many new homes now have a cellar under half of the house. Cellars are seldom found in Dallas or Fort Worth. In Jacksonville they are also unusual, probably due to the small distance to water level. Newer homes in Los Angeles of 2-story type often have a heater cellar 6 by 8 feet, but bungalows usually omit this item. The bungalows are piped for gas or have a special gas furnace recessed in the space under the floor joists.

While appreciable savings might be made by omission of portions of the cellar in other cities, there is no apparent trend in this direction, probably because of sales resistance and difficulty with financing agencies.

ACTIVITIES IN TRADE STANDARDIZATION

(Division of Trade Standards)

NATIONAL EFFECT OF STANDARDS.

It is because of standardization of industry that western civilization has been able to forge ahead and eastern civilization remains pretty much where it was one or two centuries ago, says N. F. Harriman in his recent book on Standards and Standardization.

While we invite and secure the labor-saving devices which make life more enjoyable, through standardized methods of manufacture, the oriental has denied himself these things, but has standardized his personal life. The Chinaman's clothes, thatched hut, wooden plow, and rice paddy are surely as standardized as anything found in American civilization. These things have been standardized there for centuries, and yet China has little desire to adopt modern machinery and methods. If the Chinaman had more standardized agricultural machinery, tractors, locomotives, and automobiles, his life would become much less standardized and he would not be bound by the unchanging customs of the past.

No one can doubt that the standardization of materials, machines, processes, and products of manufacture has been one of the prime aids of American progress in the industrial arts. When a standard gauge of track, standard couplers, air brakes, etc., was adopted for all railways, the unification of all the lines on the continent into a single system of transportation, by the interchange of cars, was made practically possible. Think what it would mean if each individual railway had its own gauge of track, so that no cars or locomotives

but its own could run upon its rails; think what it would mean if each make of automobile required its own peculiar tires and spark plugs; the efficiency of these great inventions would be so minimized as to be all but destroyed. In standardization the same principle has been applied with equal advantage to a thousand other things, great and small.

DRESS PATTERNS.

The manuscript for Dress Patterns, Commercial Standard, CS13-30, is now in the hands of the Government Printing Office, having been accepted by a satisfactory number of manufacturers and users, and will be issued in printed form in the near future. This covers standard classifications and corresponding body measurements used as a basis for size designation of commercial dress patterns and does not apply in any way to ready-to-wear garments. According to the commercial standard, dress patterns will be classified by the following terms: Ladies, misses, juniors, girls, children, infants, boys, and little boys. For each of these classifications a range of sizes is set up and definite body measurements are established for each size.

Former references to age have been eliminated in favor of references to size only; thus a dress pattern formerly designated as "Misses, age 18," will now be sold as "Misses, size 18," and will be based on the following body measurements: Bust 36 inches, waist 30 inches, hip 39 inches.

It is expected that this commercial standard will clarify in the minds of the consumer, the classification terms and size designations used by the producers and will materially reduce the present difficulty of the distributor in furnishing proper sizes.

WARDROBE AND DRESS TRUNKS.

A representative of the division of trade standards delivered an address entitled "Limiting Luggage Liabilities," before the National Luggage Dealers Association in New York City on August 13, 1929, reviewing the current effort toward establishing minimum standards of quality for wardrobe and dress trunks. This movement has been sponsored from its inception by the American Association of General Baggage Agents, representing the American and Canadian railroads and express companies. At the request of the latter association, the Freight Container Bureau of the American Railway Association rendered a report dated December 5, 1927, to develop a standard specification for trunks for the transportation of personal baggage by railroads.

With this information at hand, the Trunk, Luggage, and Leather Goods Manufacturers of America are preparing to draft a minimum specification for wardrobe and dress trunks which will later be submitted to other divisions of the industry for comment and criticism. The National Luggage Dealers Association is eager to have something accomplished along this line to reduce the present hazards of stocking and selling luggage, and to enable the ultimate consumer to purchase with greater confidence and satisfaction.

WROUGHT IRON PIPE NIPPLES.

Wrought Iron Pipe Nipples, Commercial Standard CS6-29, is now available in printed form at 10 cents per copy from the Superintendent of Documents, Government Printing Office, Washington, D. C. It comprises a complete specification for this commodity, including dimensions, tolerances, threading, gauging, chamfering, as well as stock sizes and lengths of the various grades. Single copies are available on request to organizations indicating their desire to scrutinize the commercial standard with a view toward adopting it as their standard of practice in the production, distribution, or consumption of this commodity.

BRASS PIPE NIPPLES.

Brass Pipe Nipples, Commercial Standard CS10-29, is similar and parallel in many respects to the above-described pamphlet on Wrought Iron Pipe Nipples. It is now available in printed form from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 10 cents per copy.

SPECIFICATIONS IN FEDERAL CATALOGUE

The Federal Specifications Board has approved recommendations that in the future the United States Government master specifications are to be designated as Federal specifications and, as such, are to be printed in loose-leaf form as an appropriate section of the Federal Standard Stock Catalogue. This section will be available by purchase as a whole, or in part, from the Superintendent of Documents, Government Printing Office, Washington, D. C. Rear Admiral T. H. Hicks, U. S. N., chairman of the Federal Standard Stock Catalogue, contributed an article in the August issue of the *COMMERCIAL STANDARDS MONTHLY* on the subject of the Federal Standard Stock Catalogue.

A revision of alphabetical index and numerical list of Federal specifications, promulgated by the Federal Specifications Board, has been prepared for printing and will later be available by purchase from the Superintendent of Documents, Government Printing Office.

CAMPAIGN AGAINST WASTE

It is estimated that more than 100 manufacturing companies participated in the elimination of waste campaign of 1929. The campaign is an educational movement aimed at the elimination of small wastes. The plan is flexible and may be used in various ways and at any time. It consists in the display of exhibit boards which visualize the nature, cost, and the method of avoiding wastes. These exhibits are made up by department committees, but interest is also aroused by talks from the management and by daily features in the house organs.

The Oakland Motor Co., of Pontiac, Mich., which employs 12,000 men, spent this year \$10,000, or 80 cents per employee, in getting out posters, exhibits, and daily news stories. The stories centered around specific incidents and usually carried pictures of the foremen or employees involved. As a result, 3,385 suggestions for waste elimination were received. Prizes totaling \$1,247 were given for these suggestions and for the best exhibit boards. The management reports that 35 per cent of the suggestions have been found of high value, and that many others are expected to be of some value.

The Newport News Shipbuilding & Drydock Co. estimated its 1927 savings from this campaign at \$250,000. The Westinghouse Electric & Manufacturing Co., of Pittsburgh, Pa., was the originator of the plan, although it evolved the idea from the management week movement.

AMERICAN MARINE STANDARDS COMMITTEE NEWS

The American Marine Standards Committee is of national scope. It is constituted of representative interests of the marine and allied industries. It is self-governed through an executive board elected annually by the member interests. Its purpose is to unify practice and eliminate waste in construction and operation of ships and port facilities. The Government is prominently identified with it through members representing the Navy and War Departments, Coast Guard, and bureaus concerned with shipping and ship building. The committee's work is aided by facilities and services

furnished by the Department of Commerce through the Bureau of Standards and by the United States Shipping Board.

INTERNATIONAL MARINE STANDARDS.

The Standardization Commission in Holland, acting in behalf of the International Standards Association, has submitted definite proposals for international standards for anchor chains, (stud link), glass for air ports and fixed lights, and vertical mooring bitts. These have been submitted to the A. S. M. C. standing

committee on "international standardization" for approval or critical comment. A list of other marine subjects proposed to be placed on the program for international standardization is also being considered.

MOORING PIPES.

A proposed standard design approved by the technical committee on "hull details" has been submitted to the membership for ballot vote. Its prime purpose is to standardize the hole in the bulwark plate and the position of rivets to secure interchangeability.

VENTILATOR COWLS.

Investigations by the Navy Department have shown that the inlet ratio of 2 to 1 diameters in relation to the ventilator pipe, generally used for supply cowls of merchant ships, is excessive and is not as efficient as a lower ratio of from 1.2 to 1.5 diameters. Tests of exhaust ventilator outlets made by the Bureau of Standards indicate that a prevailing type of ship exhaust cowl, with an air jet from the wind to induce suction flow through the outlet, is not as efficient as a plain cone outlet with its closed point to the wind. Principles based upon these findings are under consideration by the subject committee as a proposal to govern future design of supply and exhaust cowls. If these principles are accepted, and simplified types of cowls in accordance with them can be standardized to the satisfaction of the shipowners and shipbuilders, there will be a material saving in cowl construction and maintenance.

HULL CONSTRUCTION.

A preliminary draft of proposed rules on standard practice in hull construction, has been submitted to the membership for ballot vote. This is a revision of a prior draft approved by the technical committee on "hull details," in which suggestions received from the committee have been incorporated. These proposed standard rules are intended to simplify ship contract specifications, establish a common standard in the shipbuilding industry, and define the scope of inspection in order to minimize the liability of costly disagreements and delays in construction. It embraces those features of structural work regarding which there is diversity of opinions, namely, punching, drilling, reaming, and countersinking of rivet holes; treatment of faying surfaces; scarping, lining, and joggling; welding and gas cutting; shoring, fairing, and bolting of the structure in assembling; heating of rivets and riveting; caulking, watertightening, oil-tightening, and testing.

METAL TUBULAR FRAME BERTHS.

Proposed standards covering types suitable for staterooms, and for fixed and folding standee berths, also fittings for their construction and installation, which were approved by the technical committees on "hull details" and on "ship-operation details and supplies," are before the membership for ballot vote. The governing features of these proposed standards are: Simplicity of construction, with adequate structural strength; smooth surfaces preventing lodgment of dirt or vermin; hollow spaces closed against vermin and their use for smuggling. Optional materials and finish are provided for.

PUBLICATIONS.

The following publications were distributed during the past month, copies of which are available from the Superintendent of Documents, Government Printing

Office, Washington, D. C.: AMSC 52, Medical Equipment for Ocean-Going Vessels; AMSC 53, Medical Equipment for Coastwise and Lake Freighters; AMSC 54, Medical Equipment for Small Vessels; AMSC 55, Specifications for Ship Propellers and Templates for Propeller Blade Flanges and Bolt Holes.

INDUSTRIAL AND BUSINESS RESEARCH

"As an industrial X-ray probing basic causes and fundamental conditions, research is doing much to stimulate production, lower costs, raise the standard of living, and stabilize business," said Harold Vinton Coes in Management Review in discussing Reverberations of Industrial and Business Research. "For example," he said, "in the iron and steel trade, it enables an operator to produce 1,250 tons per year as against the 81 tons of 50 years ago. In the glass industry, 45 bottles were produced per man per hour in 1899, to-day the rate is 950. In the chemical field, research has established an industry whose quantity and quality of output is the marvel of competing Europe. In every business to which it has been applied, research has tended to remove those hazards which make for cyclical fluctuation and instability. It has lifted industry from the quicksands of supposition and guesswork to the rock of knowledge."

PRECISE LENGTH STANDARDS

The revolutionary development which is taking place in the science of precision measurements is well illustrated by the consideration now being given to various spectral lines as possible fundamental standards of length according to the Bureau of Standards. Light waves as a practical length standard would have seemed impossible a few years ago, yet to-day scientific and technical men accept them as a matter of course and use them regularly for precise measurements.

In this connection, the July number of the bureau's Journal of Research contained a report on the first spectrum of krypton, discussing the proposed use of a certain yellow-green line in the spectrum of this element as a fundamental length standard. The bureau's analysis shows that theoretical objections can be raised against this krypton line as a primary standard. The line is not sufficiently intense for general practical use, and it is associated with a condition of the atoms which favors absorption or reversal of the line. The bureau suggests other krypton lines to which these objections do not apply, but none of these lines can be recommended definitely as primary standards until they have been further examined to find whether they are in reality single lines or are composed of numerous very fine lines. In the latter case they would be unsuitable as standards.

Ramsey and Travers discovered a new constituent of atmospheric air in 1898. They called it krypton, ("hidden"), and indicated that its spectrum was characterized by two brilliant lines, one green and the other yellow. In the 30 years which followed this discovery a considerable number of attempts were made to amplify the description of krypton spectra, but none of them were complete or accurate enough to permit a satisfactory analysis of the spectral structures. Interest in the first spectrum of krypton was revived in 1927, when the International Conference on Weights and Measures, recommended that a yellow-green krypton line be investigated as to its suitability as a

primary standard of wave length which might be substituted for the red line of cadmium provisionally adopted as the fundamental standard. In investigating the possibility of rare gas spectra as sources of length standards of superior quality, the Bureau of Standards is attacking the problem by a new method. Instead of beginning with a tedious examination of the behavior of different lines under varying conditions, preliminary descriptions of the entire spectra have been prepared. These descriptions permit identification of the atomic energy states, and classification of practically all of the spectral lines. The relative values of energy levels and the quantum numbers associated with them give information about the characteristics of the individual lines and enable one to discuss their relative merits as wave-length standards. Thus the relative intensities can be derived theoretically, the susceptibility of any line to reversal or to pressure can be estimated, and the lines theoretically best qualified as standards may be then selected for practical tests.

NATIONAL ELECTRICAL SAFETY CODE

The public and at least three major industries, namely, the telephone and telegraph, the railroad, and the power supply, are involved in the use of streets and highways by electrical lines. Where these and other interests make important contact, mutual understandings, in the form of standards known by and acceptable to all, are an important economic asset. Where the property and operation of one interest may imperil the well of others, accepted standards of safety are necessary to keep the commercial progress of all in order. The National Electrical Safety Code embodies such standards.

The precepts included in the code are not arbitrary. They are the result of long experience within each group affected and between each group and its neighbors. The standard is alive and will continue to develop and grow, reflecting the evolution of methods and applications. The rules of the code represent a of practical economic balance of what can be done by all concerned to bring about satisfactory conditions safety.

Before the year 1914 the attention of the Bureau of Standards was drawn to the need of a national safety code for electrical practice. At this time there were no generally accepted construction rules framed from the standpoint of the life hazard. Relatively few of the electrical companies possessed printed sets of operating rules, and most of these were far from complete. To prepare a single reasonably complete code that could be adopted or used as a reference standard by State industrial and public service commissions, municipal administrations, insurance interests, and other industrial groups, such as the telephone and telegraph, electric power, and railway interests, seemed to be in the highest degree desirable. It was evident that, with so many interests involved, the preparation of such rules in a form that would be adequate and satisfactory would be no easy task. Since adequate cooperative channels for the development of safety standards affecting so many diverse interests not in existence at that time, the activity of a disinterested body of national scope, such as the Bureau of Standards, seemed necessary to the success of the project.

In preparation for this work it was necessary for the bureau to send its engineers to all parts of the country to determine by actual investigation in the field what constituted average good practice in electrical con-

struction and safety methods. Thousands of data sheets, including tabulations and measurements of physical qualities and factors of safety, were assembled and studied. A tentative code expressing the results of this study, setting as a standard average good practice, was prepared for trial and criticism.

With a tentative standard and information on good practice in hand, the bureau arranged for the nationwide cooperation and assistance of State industrial and public service commissions, municipal electrical departments, engineers of operating and manufacturing companies, committees of engineering societies, and representatives of fire and casualty insurance interests and of electrical workers. A large number of formal and informal conferences were held by representatives of the bureau with those interested. Formal conferences were held in Boston, Schenectady, New York, Philadelphia, Washington, Atlanta, Columbus, Chicago, St. Louis, Denver, Boise, Los Angeles, San Francisco, Portland, and Seattle.

Many differences of opinion were expressed in these conferences, but many of these differences were removed or modified in the course of the discussion, and the standard approached more and more closely to an expression of American good practice.

With the establishment of the American Standards Association and its Safety Code Correlating Committee, machinery for the cooperative development of safety codes of national scope came into existence. It was then appropriate to place further development of the National Electrical Safety Code under the auspices of the American Standards Association, and this was done.

The first edition of the code, entitled "Proposed National Electrical Safety Code," appeared as Circular of the Bureau of Standards No. 54, April 29, 1915. Since the inception of the project, the National Electrical Safety Code has gone through four major revisions. The current edition is known as Handbook No. 3, fourth edition, December 31, 1926, and was prepared by committees representative of all important interests affected, under the procedure of the American Standards Association. It is approved as American standard.

In addition to two supplementary sections, giving definitions of terms and rules for the grounding of electrical apparatus and circuits, the code consists of five principal parts as follows:

Part 1. Rules for the installation and maintenance of generating stations and substations.

Part 2. Rules for the construction and maintenance of electrical supply and communication lines.

Part 3. Rules for the installation and maintenance of electrical utilization equipment.

Part 4. Rules for the operation of electrical equipment and lines.

Part 5. Rules for radio installations.

The completed code has received the general support of all those affected and has exerted a powerful influence toward securing better electrical construction. It has facilitated commercial agreements, usually confirmed by State authority acting for the public, at points where the interests of various industrial groups seemed likely to conflict, such as where two or more lines must use the same highway, or at crossings of various classes of electrical lines, and at crossings of railways and highways.

The code or parts of it or rules based on the code have legal force in 26 States, and the code is officially used as a guide to practice in 8 States.

The casualty insurance interests have as a group adopted the National Electrical Safety Code and are applying it in their inspections and rating schedules.

Many of the rules of the code, such as those applying to the construction and operation of power supply plants and industrial electrical utilization equipment, may not involve at the same time more than one commercial interest. They more likely involve the public interest with that of a corporation or the mutual interests of employer and employee. In these situations, even where legal enforcement or casualty insurance differentials may not extend, there is so much interest in the subject of safety, and so many managers are anxious to have their employees properly protected, that the rules are applied voluntarily. Where State and city administrations provide competent inspectors, their inspections will usually have, to some extent, an educational value and compliance is generally a willing one. The commercial security afforded by compliance with safety rules of wide and authoritative recognition usually provides sufficient incentive.

In this connection it is of interest to note recent announcements of a manufactory of switches and panel boards, which appeared in various trade journals, that it will no longer manufacture or offer for sale, equipment or apparatus not in entire conformity with the National Electrical Safety Code.

This specific case may be considered as an illustration of the general principle that the code requirements are intended to appeal to the enlightened self-interest of the electrical industry as a whole. The procedure of the A. S. A., which gives voting representation to every interest covered, assures full consideration for all points of view. Such consideration takes time and makes development of the code a slow process. The results, however, have justified the procedure and have made the National Electrical Safety Code an outstanding example of the principle of self-government in industry.

USE OF SPECIFICATIONS BRINGS SAVINGS

The effect of specifications in deflating commodity prices is sometimes astonishing, even in those cases where the article in question is not bought in large enough quantities for savings due to mass production to be really effective. A prominent municipal purchasing agent reports the purchase of 200 "biological desks" for school use upon specifications which were prepared by taking apart and carefully studying a desk of satisfactory design. An architect then wrote a specification which incorporated the desirable features of construction, material, character of workmanship, finish, etc., and upon the basis of the competition so obtained the desks were purchased at \$89 each, instead of \$174 previously paid. "Tablet armchairs" also used in schools, when purchased under specifications, dropped in cost from an average price of \$11.20 to an average price of \$6.15 when specifications were written in such form and with such provisions that competitive bidding was made possible.

INCLUDES S. P. R.'S IN CATALOGUE

The Richards & Conover Hardware Co., of Kansas City and Oklahoma City, with an unbroken record of 72 years in the hardware business, has included the identification of simplified practice recommendations issued by the Bureau of Standards, wherever possible and practicable, in their new catalogue just issued.

This catalogue has also been simplified as to pricing, printing, composition, and arrangement. This action is typical of the service afforded this company's customers, since by keeping them thus informed, their customers will be enabled to concentrate their requirements and purchases on the simplified lines, sizes, etc., thereby reducing inventories, securing quicker deliveries, and effecting many other savings, all along the line of distribution and use.

SALVAGING OLD LAMPS

Burned-out electric lamps are being salvaged by the New York Edison Co., through the employment of a machine especially built for the purpose. Only the brass shells at the end are worth saving, but the scrap-metal value of these is sufficient to warrant reclaiming. In the past, the reclaiming method was to break the lamps by hand. They were put into a barrel rigged like a churn, with a plunger worked up and down. This was a slow process, and too much material adhered to the brass shells.

The new machine consists of a motor-driven revolving steel cylinder perforated on the inside with holes not quite large enough to permit the brass shells to fall through. A barrellful of glass bulbs, perhaps 300 or 500 of all sizes, is poured into the cylinder. Loosely placed among the lamps are two long steel bars covered with prongs. As the cylinder revolves at high speed, these prongs knock the glass, filament, and cement loose from the brass shells. The broken waste falls through the holes in the cylinder and the clean brass shells remain inside of it.

PROFITS FROM WASTE

One of the most interesting papers presented before the national convention of The Society of Industrial Engineers, was that of Virgil M. Palmer, on Profits From Waste. The speaker divided industrial waste into three classes—class 1, waste occasioned through low yield, or inefficient use of consumable tools, accessories and supplies; class 2, waste occasioned through failure to use the by-products from production operations; and class 3, waste occasioned through the obsolescence of plant, equipment, or product.

When possible, waste should be reduced at its source. It should never be allowed to exist. Class 1 lends itself fairly readily to an attack at this point. Class 2 presents, perhaps, the most difficult, but the greatest opportunities for profit. Much has already been accomplished through the utilization of these waste by-products for new and useful purposes. Class 3 is, many times, justifiable waste. It is waste created through discarding the old for the new. It is the price paid for progress, and is justified through the benefits to be attained. When we do not find these conditions we find the forerunner of stagnation and decay.

CARTON SIZES SHOULD BE STANDARD

The most progressive program that can be undertaken by the dried-fruit industry will be the standardization of carton and shipping case sizes, says a writer in the magazine, *Western Canner and Packer*, discussing the advantages of standardizing the carton sizes used by that industry, adding that "savings that will result from standardization of carton and shipping case specifications will extend to every division of the dried-fruit industry."

NOTES FROM THE AMERICAN STANDARDS ASSOCIATION

STANDARD FOR RADIO-TUBE BASES.

The first authoritative national standard for radio equipment has been prepared by the sectional committee on radio, (C16), under the chairmanship of Dr. Alfred N. Goldsmith, vice president of the Radio Corporation of America, and approved as American tentative standard by the A.S.A. The Standard governs the dimensions of both large and small types of radio-tube bases. The Institute of Radio Engineers and the American Institute of Electrical Engineers are sponsors of the A.S.A. radio committee, which includes representatives of 19 national organizations. In addition to the standards for vacuum-tube bases, the committee is also working on standards for transmitting and receiving sets, and installations, component parts and wiring, electroacoustic devices, and power supply and outside plant.

TWIST-DRILL SIZES.

The technical committee on standardization of twist-drill sizes, a subgroup of the A.S.A. sectional committee on the standardization of small tools and machine-tool elements, (B5), has carried on an intensive study of the 138 drill sizes carried in stock by the various drill manufacturers and users in the size range from No. 80, (0.0135) to one-half (0.5000), inclusive. As the result of this study the committee has prepared two proposals covering diameters and length, which are considered satisfactory for drill use by industry. The proposals are now being circulated among users of these drill sizes to determine which are preferred. Copies of the proposals may be borrowed for review through the A.S.A. headquarters, 29 West Thirty-ninth Street, New York, N. Y.

OUTLET BOXES.

The A.S.A. has approved as an American standard the specification for outlet boxes, (C33a), submitted by the Underwriters' Laboratories under the proprietary sponsorship method. This standard is now in actual use by the Underwriters' Laboratories in judging the acceptability of outlet boxes submitted for examination, test, and report. Prior to submittal to the A.S.A. for approval, the laboratories had the standard reviewed by all manufacturers of outlet boxes and others substantially concerned with the scope and provisions of this standard. Virtually unanimous approval of all these organizations was obtained.

NATIONAL ELECTRICAL CODE.

The latest revision of one of the electrical industry's most important standards, (the National Electrical Code), has been approved as an American standard by the A.S.A. The 1929 edition of the code, like previous editions, is the industry's basic guide for safe practice in the wiring of consumer premises for the use of electricity for light, heat, and power. The code was first drafted in 1897 and has been revised fifteen times to keep pace with the rapid developments in the electrical industry. The National Fire Protection Association was sponsor of the technical committee which prepared the revision. The committee includes 76 members and alternates, representing 36 national and local organizations. These include Federal, State, and municipal officials, and representatives of various divisions of the electrical industry, fire-insurance organizations, architects and builders, and other industries. The code may be ordered through the A.S.A. office.

A.S.A. YEARBOOK.

A review of the national standardization activities of the American Standards Association is contained in the 1929 yearbook of the association, which was recently published. The yearbook lists about 150 national standards which have already been completed and about 175 other projects under way.

The yearbook lists, among the standards completed under the auspices of the association during the past year, a group of 19 specifications and methods of test for various petroleum products; a comprehensive code for protection against lightning, including sections for protections of persons, of buildings and miscellaneous property, and of structures containing inflammable liquids and gases; standard track gages and car sizes for metal mines; a group of six specifications for bare and insulated copper wire, (this is the first time that standard specifications for cotton, silk, and enameled magnet wire have been available); two more standards for pipe flanges and fittings; and specifications for track work, covering material for both steam and electric railways.

Important new projects initiated, according to the yearbook, include specifications for pressure and vacuum gages; specifications for leather belting; specifications for materials and workmanship for plastering; specifications for coal-mine cars; and a comprehensive code on mine timbering, including specifications for timber and a code of timbering practice.

STRUCTURAL STEEL SPECIFICATIONS

The American Institute of Steel Construction has issued a booklet containing specifications for structural steel for buildings, including both the standard specifications of the A.I.S.C., for design, fabrication, and erection, and the standard specification of the A.S.T.M., A-9-24, covering the quality of the material. It also contains the A.I.S.C., standard specification for fireproofing structural steel buildings and the code of standard practice. In addition, there is included the minimum live loads allowable for use in the design of buildings as recommended by the Building Code Committee of the Bureau of Standards.

RADIO AS AN AID TO RESEARCH

The technique of radio measurements now constitutes a physical tool of considerable potency, says Dr. J. H. Dellinger, of the Bureau of Standards. This tool is useful in many fields besides radio itself, ranging from fundamental measurements of the unit of time to the electrical and chemical constitution of the upper portions of the earth's atmosphere.

Fundamental time measurements, as the basis of frequency standardization, are of outstanding interest. While frequency determination reduces essentially to a time measurement, it is only now that frequencies are beginning to be measured in terms of time with an accuracy approaching that of the fundamental time standard itself, viz, the rotating earth. This is because of recent developments in (a) a radio-frequency standard of adequate constancy, (b) technique for accurate comparison of radio-frequencies with the unit of time.

MISAPPREHENSION AS TO QUARTZ PLATES.

The principal recent development in radio-frequency standards is, of course, the piezooscillator. There is still current a vast amount of misapprehension about the accuracy of quartz plates as radio standards. As used to-day in many radio stations the accuracy is little better than 1 part in 1,000, and even this requires specialized handling of the cutting, grinding, and mounting, and thereafter testing and selection of the finished quartz plate. When an experimenter, besides taking these precautions, designs piezooscillator circuits and associated apparatus with care, and keeps the quartz plate at constant temperature, it is possible to secure a standard which holds its frequency within a few parts in 100,000. Extraordinary attention to all physical factors involved has made it possible to produce piezooscillators which appear likely to be accurate to 1 part in 10,000,000; these are laboratory devices requiring exceptional care and use. With their advent the problem of frequency standardization may be said to be solved.

While other phases of radio measurements have no such brilliant advances to record, progress is being made and satisfactory methods are available. Capacity and inductance measurements are usually made by some form of substitution in a tuned circuit, the most precise comparisons using a heterodyne method for indication. Recent papers make available convenient formulas for calculation of the inductance of coils used in radio practice.

STANDARD METHODS OF MEASURING.

The vacuum-tube voltmeter has found extensive applications. Small currents are usually measured by a thermoelement and galvanometer; medium and large currents by instruments based on the heat produced in a thin wire or strip. An electrodynamic type radio-frequency ammeter has recently been developed. Measurements on such devices as vacuum tubes and receiving sets have passed beyond the laboratory stage and are extensively used in factory production tests. Standard methods of measuring numerous characteristics of these devices just have been adopted by the Institute of Radio Engineers and will be available in its 1929 yearbook. The properties of loud speakers have also been subject to a variety of measurements, and methods of measuring them described in current periodicals.

There are now many laboratories and workers engaged on measurements of radio-field intensity and intensity of atmospherics. These measurements involve fundamentally the use either of a calibrated receiving set, or of a receiving set with a means of comparing the intensity of the incoming field with a locally measured voltage. There is a great deal of literature available on these methods, together with related measurements on fading and wave direction and polarization. Recent trends include the development of automatic recorders and applications of the cathode-ray oscillograph.

The measurements of radio-field intensity, and thereby radio-wave phenomena, have been particularly fruitful during the past year in determining the height of the Kennelly-Heaviside layer and revealing many facts about the constitution of the upper reaches of the atmosphere. The measurements of the layer height have given concordant results by several methods—(a) frequency change method, (b) angle of incidence, (c) time interval group retardation, and (d) long echo signal time.

Some of the long echo signals have been interpreted as indicating radio-wave paths extending out from the earth farther than the moon and back. Whether this be correct or not, we now have a vision of radio measurements as an instrument, not alone for terrestrial use but for exploring the depths of space.

MACHINIST' VISES STUDIED

Results of an investigation of the efficiency of various weights of machinists' vises are soon to be published by the Bureau of Standards. Although the industrial arts rest fundamentally on the simple hand tools which have been known and used for centuries, no tests have been reported previously showing the most efficient vise for a given job.

An investigation was therefore undertaken at the bureau to determine the relationship between the size of the vise and its efficiency by performing typical shop operations on material held in the vise. These operations consisted of sawing, bending, and riveting steel specimens, and were carried out under carefully standardized conditions, using 12 vises of the stationary bottom type having different length of jaw from 2-inch, (9-pound), to 9-inch, (282-pound).

In those tests, which may be described as static tests—for example, the sawing tests—in which the movement of the tool was large compared with the movement of the vise, the tests showed no appreciable difference in the efficiency with which the work was performed. On the contrary, in the dynamic tests—for example, the riveting tests and some of the bending tests on large specimens—the weight or inertia of the vise had an appreciable effect on the efficiency with which the work was performed. The efficiency of the 5½-inch, (102-pound), vise was greater than for any of the lighter vises, but was about the same for all vises larger than 5½-inch.

NEED FOR SIMPLIFIED CONTAINERS

Expansion of the farm-produce-container industry to keep pace with the increasing fruit and vegetable business has produced in recent years a multiplicity of crates and boxes that in many instances amounts to confusion, according to an announcement of the Bureau of Agricultural Economics, Department of Agriculture.

According to the bureau more than 1,000,000,000 containers are required to package the approximately 1,000,000 carloads of fruits and vegetables shipped annually in the United States. These containers are of five types—baskets, crates, boxes, barrels, and sacks. There are seven types of baskets, crates, and boxes having either panel or solid ends, and there are three types of barrels. Sacks are generally made of jute, but investigations are now being made of the practicability of using cotton or other fibers.

Containers in use for shipping a given commodity vary widely in different sections of the country. For the same kind of vegetable one section may use a basket, another a crate, a third a barrel, and a fourth a sack. Fruits and vegetables taken into city markets by near-by farmers may move in a variety of containers. In a New England city spinach was found on the market in lettuce crates, egg cases, orange boxes, and hampers.

Many of the variations in fruit and vegetable containers will always exist, because different types of commodities require different types of containers and because manufacturers in different sections of this

country can readily supply certain types of containers and can not supply other types. Inability to supply other types is the principal obstacle in the way of adopting a specific container throughout the country for any given commodity.

Discussing possibilities of simplification in boxes and crates, the bureau declared that "if practicable, it would be desirable to have a uniform length for apple-box shoos so that tops and bottoms could also be used for peach, pear, and other boxes. Sizes of asparagus crates might be simplified by using the 1 and 2 dozen sizes for bunched asparagus. Variations in sizes of crates for cantaloupes is due to an attempt to make the crate fit the pack. Instances are cited of large growers using an electric saw with which slats were sawn for crates made each day to fit the melons."

"Much confusion," said the bureau, "has existed as to the sizes of cherry boxes, as many as 15 different specifications being reported. Attempts to pack a certain number of pounds to a box are responsible for these variations.

"California for many years has attempted to bring about the standardization of grape containers, but the demands of shippers' organizations for variations in sizes resulted in chaos. At present 13 different standard containers for grapes are provided, but a reduction to 10 is contemplated."

TRADE PAPERS APPROVE EDITORIALY.

This statement of the Bureau of Agricultural Economics has added weight because of an editorial appearing in a recent issue of the magazine "Food Industries," which said that the standard size food containers are becoming widely used.

Food manufacturing groups are beginning to appreciate the great inherent advantage for their industries in adoption of size standards for food containers, said the editor writer of the "Food Industries," adding that there has often been a misunderstanding of the meaning of this movement, (simplified practice), toward uniformity in packages. Some manufacturers have felt that they lost their identity and suffered some commercial disadvantages through the adoption of standard sizes.

Such fear has not been realized for the very good reason that the adoption of container sizes under the division of simplified practice of the Bureau of Standards program is carried forward only when the industry itself takes the initiative and reaches substantially unanimous agreement.

There are still many cases in which hundreds of odd sizes of containers are used where a half dozen or dozen sizes would suffice equally well from the standpoint of both producer and consumer of the food.

If any industrial unit believes that such a condition prevails in its business, it will be well for the management of such concern to take up the question of simplification with the Government staff which specializes on these projects. The officers of such companies need not fear that the Government will take the matter out of their hands and try to "run the show" contrary to the best interests of any industrial group. They will get a very sincere and straightforward cooperation, which will facilitate a determination of the facts involved and insure prompt adoption of uniform package sizes only in such circumstances as can be justified on the score of both efficiency in production and effectiveness of distribution.

SAN DIEGO ADOPTS STANDARDIZATION

A recent clipping from the San Diego (Calif.) Sun announces the appointment by the city council of a standardization committee. This committee proposes to follow the lead of other progressive municipalities by standardizing all the regular purchases made by the city. In the case of special supplies, such as medical, fire-fighting, and engineering equipment, recommendations made by the various heads of departments will be followed.

BRITISH WANT SIMPLIFICATION

There are thousands of articles which are made by the million. These are articles which everyone must have and which do not require to be possessed of an individuality to please the fastidious says the Aberdeen Press and Journal in an editorial comment on an address by the Hon. H. G. Williams, M. P., to the Aberdeen Chamber of Commerce.

But in the case of many of these articles the British manufacturer still keeps on presenting the public with an unnecessary choice, with the result that the factory can not save as it would in mass production. The shopkeeper has to stock the variations with a loss or depreciation of value on those which do not sell so well; and the country loses in the matter of export trade because of the cost of variation. Standardization and simplification in such instances would not offend inherent British taste, and it would help Britain and the British in ways calculable and incalculable.

NEWS FROM THE AMERICAN SOCIETY FOR TESTING MATERIALS

NEW STANDARDS DEVELOPED.

The American Society for Testing Materials, through its 49 technical committees, has developed a number of new specifications and methods of test which were presented at the annual meeting of the society in June and accepted by the meeting for publication to elicit comment and criticism. Under the society's standardization procedure it is customary to publish all proposed standards for a year or more as "tentative," thus securing the benefit of trial before the standards are definitely established. A wide variety of subjects is covered.

As a result of the demand from large consumer organizations for working basis in the purchase of steel springs, the society, in cooperation with the Railway Spring Manufacturers' technical committee, developed tentative specifications for "heat-treated carbon-steel helical springs."

Tentative specifications for "gray-iron castings" for valves, flanges, and pipe fittings were developed as a result of a request from the Sectional Committee on Pipe Flanges and Fittings, functioning under the American Standards Association, for a specification covering "stock" goods; that is, finished flanges, valves,

and pipe fittings of cast iron manufactured in advance and supplied from stock by the manufacturer or jobber.

A set of tentative definitions of magnetic terms, with units and symbols relating to magnetic testing which has been developed is a compilation of those magnetic terms, conceptions, and quantities most commonly required in the electrical industry. The symbols are in complete accordance with those adopted by the American Institute of Electrical Engineers.

An "accelerated life test for metallic materials" for electrical heating has been added to the society's several methods of testing high temperature and electrical resistance alloys. This method covers the determination of the resistance to oxidation at high temperatures under intermittent heating of metallic materials for electrical heating.

Recent developments in the preservative coatings field have led to the formation of tentative specifications for soluble nitrocellulose and for several solvents, namely, specifications for ethyl acetate, (85 to 88 per cent grade), butyl acetate, (85 to 88 per cent grade), and butanol, (normal butyl alcohol). The Committee on Preservative Coatings for Structural Materials has also developed a method of routine determination of acetone extract in dry lampblack and dry bone black and a test for polishing lubricant in aluminum powder for paints, (aluminum bronze powder). Work on the color properties of paint materials has been completed and a method of analysis for the color characteristics of paints in terms of fundamental physical units is being published as tentative.

Extensive investigations on the oil and moisture contents of paraffin waxes has led to the development of the tentative method of test for the determination of expressible oil and moisture in paraffin waxes.

An additional specification to the society's standards for road and paving materials is the new tentative specifications for gravel for bituminous concrete base, drawn up as a result of the increased use of gravel in bituminous road construction.

The tentative methods of test for size of anthracite and tentative test for sieve analysis of crushed bituminous coal are the recent additions to the society's methods of mechanical analysis of coal and coke.

To the group of standards covering waterproofing and roofing materials, new specifications for asphalt for use in constructing built-up roof coverings, have been added. A tentative method of test for coarse particles in bituminous materials by means of elutriation has also been developed.

Activity in the field of testing rubber products for absorbing vibration has resulted in the development of a tentative method of test for hardness of soft rubber, (in slab form). It is hoped that such a test can be used as a control test on the uniformity of successive shipments of rubber products.

The specifications for asbestos tape for electrical purposes being issued as tentative are the first specifications for asbestos textile fabrics. As a result of a demand for specifications for tire fabrics a new specification for chafer tire fabric was developed and is being issued as tentative.

These new specifications and methods, together with all other specifications and methods of the society now having a "tentative status," will shortly appear in the 1929 book of A. S. T. M. tentative standards.

REVISIONS IN CEMENT SPECIFICATIONS PROPOSED.

Committee C-1 on cement of the A. S. T. M. has approved for reference to letter ballot of the committee and, if thus approved, for submission to the society's committee on standards, certain tentative revisions in the present standard specifications for Portland cement. The revisions upon which the committee is balloting include: (1) The changing of the title of the present standard so as to cover "Portland cements" instead of "Portland cement"; (2) the insertion of two sets of strength requirements in the standard, one for Portland cement and the other for high early strength Portland cement; (3) the making of the tensile-strength requirements of the 1:3 standard mortar for Portland cement 200-pound at 3 days and 275-pound at 7 days, and for high early strength Portland cement 275-pound at 24 hours and 375-pound at 72 hours; (4) the making of the 28-day test optional with the purchaser, and, when so directed, the strengths not to be lower than those obtained in the 7-day, or 72-hour test, (for Portland cement or high early strength Portland cement, respectively); and (5) placing a limit of 2.5 per cent on the sulphuric anhydride in the high early strength Portland cement.

The committee has also referred to letter ballot for reference to the committee on standards, tolerances to apply to all equipment now used in testing cement. These are essential for the proper functioning of the Cement Reference Laboratory which the society, through its Committee C-1, now maintains at the National Bureau of Standards. The committee also is giving consideration to new specifications for masonry cements.

SPECIFICATIONS FOR PETROLEUM PRODUCTS.

Committee D-2 on Petroleum Products and Lubricants for many years has been engaged in the preparation of standard test procedures for the tests in use in evaluating petroleum and its products. The standardization of the established methods of test has been accomplished and some of the newer tests are in process of being standardized. Many of the test methods have been approved as American standard by the American Standards Association.

The results of a 2-year study of the "significance of tests of petroleum products," designed to supply the need for authoritative information regarding the applicability of the tests now in common use and the significance of the results obtained with regard to the proper choice of tests and the assignment of proper numerical values to specifications based upon these tests, was made available last year.

The committee has now reached a point when the consideration of developing standard specifications for certain petroleum products seems to be warranted and it is engaged in the formation of technical committees which will study the relation between test data and service performance of materials and prepare materials specifications. These technical committees will be organized on a broad basis corresponding in organization to a section committee under the procedure of the American Standards Association and will include representatives of organizations interested in specifications for petroleum products, especially consumer organizations.

PLANS TESTS OF PROTECTIVE PIPE COATINGS

The enormous capital investment in underground pipe systems, and the well-established fact that this pipe is being attacked by the surrounding soil has resulted in much discussion by those who are responsible for the maintenance of these pipe systems. The problem of pipe protection is of such vital interest to the gas industry that the subcommittee on pipe coatings and corrosion of the distribution committee of the American Gas Association has supplied funds for the study of this problem and has appointed a research associate at the Bureau of Standards.

Every gas engineer who has a pipe system to protect must decide whether or not it is economical to apply some kind of a coating to his pipes and if he feels that protection is necessary he must choose the kind of coating that he will use. But in attempting to choose the coating he finds that his principal source of information is the coating manufacturer. Here he finds a number of conflicting and often well-grounded opinions as to what a protective coating should be, and his final decision will probably depend largely upon the source of his information. The characteristics and properties of a material which is available and cheap and which will best protect a pipe are not definitely known, and they may depend upon the kind of soil in which the pipe is laid. For the above reasons any accelerated test of a coating is at this stage open to question.

STANDARD MILLWORK PATTERNS

As much as would be gained by adopting standards for moldings and general millwork throughout the United States, the many efforts put forth during the past three years to have standards adopted have to a great extent been ignored, writes M. C. Cantrell in the *Wood Worker* on the subject of "Standard Patterns for Millwork." In his article Cantrell advances two reasons for much of this failure:

First, there has been a belief by many that an adopted standard would do away with detail or special designing to a great extent, thereby depriving customers of the privilege of individual preference; this is an entirely erroneous belief. The real object of this movement was to do away with a number of local catalogues published by different local lumber organizations, usually started by some large lumber manufacturing concern, with the result that the retail yards were getting remnants of a number of patterns of moldings that were supposed to be the same, but with a difference that would not matter.

Then there were the 8,000 series and the 5,000 series, the greater number of patterns that were intended for the same, that would not match. Such conditions not only cause confusion but led to an appreciable waste of material. For the purpose of adopting a single standard molding and millwork catalogue, the 7,000 series was designed, but for some reason it did not "take" with the trade, so the "57 varieties" practice goes merrily on.

At this time the field is being questioned as to its attitude toward the 7,000 series, and the general response is that the proper solution is to make some changes in the old 8,000 series and do away with all others. This seems to be the logical thing to do, as it is not only the oldest series, perhaps, but the patterns therein come nearer to meeting the favor of the general public. Since hundreds of millions of feet of stock moldings are used every year and timber is becoming scarcer each year the work for standardization is timely.

Subscriptions to the *COMMERCIAL STANDARDS MONTHLY* should be placed directly with the Superintendent of Documents, Government Printing Office, Washington, D. C., rather than through the Bureau

of Standards. Subscription price in the United States, Cuba, Mexico, Newfoundland, the Republic of Panama, and Canada is \$1 per year, or \$1.25 per year for foreign countries. Do not send stamps when placing your subscription.

LAMP STANDARDIZATION REDUCED COST

One hundred and twenty-five million standard motor-car lamps used on present-day motor cars are of the gas-filled tungsten-filament type and account for more than one-half of the 250,000,000 miniature lamps sold in the United States during 1928, said R. E. Carlson, of the Westinghouse Lamp Co., who spoke at a recent meeting of the Chicago section of the Society of Automotive Engineers. More than 24,000,000 motor vehicles are now served regularly, and 90 per cent of their lamp needs are taken care of by 11 or 12 lamp sizes, as a result of standardization. Quantity production of a few types has reduced the retail price so decidedly that to-day it is only about 60 per cent of what it was in 1920.

LIGHT USED TO TEST MATERIALS

In many lines of work at the Bureau of Standards light is the principal factor used in the test. Some tests are intended to simulate average daylight conditions, for others only light of a particular color or, rather, wave length is used. In many instances only the light or radiation in the invisible portion of the spectrum is used—the ultra-violet and infra-red—but because the weather is such an uncertain element the scientist can not depend on the sun as a reliable source of energy for his tests. Quick, reliable results under conditions which can be duplicated and which are comparable with solar radiation are necessary. A careful spectral analysis was made of the light emitted by the sun and compared with artificial light sources, and for many tests, especially in the study of the fading of fabrics, paper, and inks, the carbon-arc lamp is used because its light has been found the closest approach to that of average sunlight. The time of exposure of samples to such light is extended as much as seems necessary. In some cases, as when testing paints and varnishes, a water spray is used to bring in the effect of rain fall. Most of the work mentioned is in the experimental stage so that just how particular kinds of material will stand up remains to be seen.

Everyone knows how difficult it is to obtain an exact color match for cloth, and it is quite a problem even for the manufacturer to duplicate any desired shade, but some interesting work being done by the bureau's textile division may solve the difficulty. A spectrograph is take of a sample, and by means of certain prominent lines or bands in the spectrum the dye for that material is definitely identified and can be exactly duplicated. Other questions entering into the dyeing of a fabric must be considered, but these should be within control of the manufacturer. The study is under way at the bureau.

Incandescent lamps are tested to insure that the lamps supplied the Government, under contract, comply with the specification for candlepower and life. Lamps of an entirely different type are calibrated for manufacturers for use in pyrometers to enable them to keep foundry operations in the working of metals well within the critical temperature ranges required.

By the rotation of a beam of plane polarized light passing through sugar solutions the percentage of sugar is obtained. By this method the bureau's sugar laboratory checks the laboratories of the Custom Service, and the duty collected by the Government on imports is based on the results of these tests.

For some kinds of work monochromatic light, or light dominant in one particular color, is used, more particularly to ascertain differences in dimension between two objects or to determine those minute but important changes which occur with change in temperature or when material is in a stressed condition. By interference of light waves a pattern of light and dark bands is disclosed, the distance from one light or dark band to another light or dark band represents one-half wave length. This method is used to check the master gage blocks for manufacturers, the accuracy of the depth of blood counting chambers used by physicians, dental amalgams, enamels for metal ware, glazes for porcelains, etc.

These are only some of the ways in which light is used to test materials at the bureau, but there are many others.

STANDARDIZATION OF INSTRUMENT DESIGN

An article by Arthur Schroder, in the magazine *Instruments*, has the following to say about the effects of standardization of design of instruments:

Within the last five years a marked change on the part of many users in demanding specific apparatus, and on the part of the manufacturer in building up corresponding specifications has been observed. When definite specifications are laid down for various tests, the accuracy and reproducibility of the tests are increased; but by standardizing the tests and the apparatus along with the tests, the cost of the apparatus is greatly reduced because specially made types are no longer necessary and larger production can be employed. Now, the tendency is to incorporate in specifications for equipment only the essentials and leave the unessentials to the manufacturer for his solution.

After a discussion of the work of trade associations and such technical societies as the American Chemical Society and the American Society of Testing Materials it is pointed out that there has come about as a result of the work of these various groups "a realization of the danger of wasteful duplication by various manufacturers or technical organizations," and, consequently, an attempt is being made to simplify and standardize the method of test and the specification for the apparatus to be used. This can be amply illustrated by a reference to such a simple instrument as a thermometer. Commercial testing laboratories were required to have 150 to 20 different types of thermometers in order to be equipped for testing the average run of technical products. To-day about 30 different types are required.

About five years ago there were over 40 control types of gas apparatus on the market, which types were considered more or less acceptable and standard. A study of these soon showed that there was a needless duplication of equipment, all designed to accomplish the same ultimate results. This meant that a manufacturer would have to carry in stock all parts for the 40 types of gas apparatus and be ready to supply replace units at a moment's notice. As a result of standardization and simplification, a complete gas-analyzing apparatus for almost any gas can be assembled in about five minutes from standard parts carried on the shelves of the manufacturers.

STANDARDIZATION REDUCES PRICES.

As a result of such standardization the appliances retained have been improved, manufactured in larger quantities, and their prices materially reduced. The development of highly specialized testing apparatus is ascribed to the enormous increase in the use of specifications for products and a consequent increase in the time consumed in testing.

TEMPERATURE CONTROL IN RUBBER TESTING

The great importance of temperature control in testing rubber has been brought out in recent work at the

Bureau of Standards. Previous work at the bureau upon the effect of relative humidity and temperature during the preparation of samples and determination of the stress-strain relation of rubber compounds has been extended to include the effect of these variables upon resistance to abrasion.

The investigation consists of a study of four compounds under varying temperatures of testing over a range from 59° to 95° F.; a study of testing under uniform conditions, samples conditioned before cure under varying conditions of relative humidity at a single temperature; and a study of testing under uniform conditions, samples conditioned after vulcanization at various temperatures while maintaining a single relative humidity.

The resistance to abrasion was determined on each of three cures of the four compounds under the above conditions with two types of abrasion machines. The investigation shows definitely that the temperature of testing resistance to abrasion must be controlled to obtain uniform results as the range of temperature covered in this study may cause variations amounting to over 25 per cent. The differences in this property vary both in degree and kind with the type of stock used.

Relative humidity during the conditioning of the raw stock before vulcanization and the temperature of conditioning the cured stock while maintaining a constant relative humidity before testing cause only minor differences in the resistance to abrasion. They should be controlled, however, to assure more nearly uniform results.

BRITISH COMMITTEE ON INDUSTRY AND TRADE

The final report of the Committee on Industry and Trade, which was appointed in 1924 to study the conditions and practices of British industry, points out that it has been made plain that the reconditioning of British industry will undoubtedly involve a great deal of scrapping and replacement of plant, and enlargement of the industrial unit, both by growth and by the regrouping of units through consolidation or other forms of association, so as to obtain the full benefits of large-scale production, elimination of waste, standardization and simplification of practice, and all the other measures of economy usually included under the comprehensive term of "rationalization."

STANDARDIZATION OF BOTTLES

Following the typical practice of European national standardizing bodies of dealing with standardization of all sorts of subjects calling for an engineering or scientific approach, the national standardizing body in Holland has appointed a technical committee to deal with the standardization of bottles for wine, beer, milk, and mineral water.

INDUSTRIAL STANDARDIZATION IMPORTANT

Industrial standardization has been a paramount factor in the recent economic progress of the United States, editorially remarks the magazine *Barrel and Box*, adding that cumulative evidence points unmistakably to the conclusion that it is one of the most significant and far-reaching methods of increasing industrial efficiency to the benefit, if properly used, of all interests concerned.

Tangible and trustworthy results regarding the achievements and economies of standardization, however, depend upon the closest cooperation within an industry, coupled with a desire to increase public economies by eliminating the unnecessary in our economic life. The achievements of standardization in the past are but guide posts to the possibilities of the future.

Standardization means many things besides the mere standardization of product as to size, quality, design, or of methods and procedure in the productive process proper. It is applied in an increasing degree to the function of business procedure in all its branches, as in establishing grades and specifications, in distribution methods, transporting and handling, clerical work, finance, and communications, always with the immediate aim of economizing material, effort, and time. So far-reaching is the application of the principle that in many instances one fails to appreciate its significance, the extent and manner by which it is advanced, its advantages to industry, and the problems to which it has given rise.

Standardization should be regarded as a tool, a method, a device, or a technique for achieving certain ends. Whether or not advantages outweigh disadvantages is found to depend entirely upon what use is made of standardization, as it may retard as well as promote industrial progress.

DAYLIGHT RADIO RECEPTION AT MAXIMUM

Daylight radio reception is now at its maximum, with static at a minimum, investigation at the Bureau of Standards indicates. The laboratory for special radio transmission research at the bureau has just compiled its annual report on long wave daylight reception for the year 1928. The report covers the receiving measurements from 13 distant stations, mostly European, and 6 American stations within 500 miles of Washington.

The curves showing the comparison of the reception conditions from 1923 to 1928 indicate that signals were weak in 1923 and 1924, and that a maximum was reached in the reception from most of the stations in 1927. The daylight static on the contrary, which was high in 1924, fell to about half of its 1924 value in 1927. The 1928 values indicate that it has about reached its minimum and may probably increase during the present year. These changes in signal and static intensities are believed to be connected with the changes in solar activity which is now probably at or a little past its maximum in the present 11-year cycle.

INTERNATIONAL AERONAUTICS CONFERENCE AT WARSAW

An international aeronautics conference will be held in Warsaw on October 4, Assistant Trade Commissioner Gilbert Redfern, Warsaw, Poland, reports to the Department of Commerce. Representatives from some 50 nations are expected to be present at the conference, which will last about 10 days. Deliberations of the conference will be primarily for the purpose of obtaining the unification of aeronautical laws by means of the conclusions of respective international conventions.

In addition, the conference will examine the project of a convention for airplane transportation and the

responsibility for the transportation of merchandise and air mail. The project of the convention, which is to be investigated by the Warsaw conference, has been elaborated by the international technical committee of experts on air laws, on which 31 countries are represented. The organization of the administrative details of the conference has been delegated to a committee headed by Leon Babinski, of the Polish Foreign Office, and Bronislas Pierschala, of the Ministry of Communications.

GERMANY SAVES ON PAPER SIZES

It is interesting to note an official statement of savings made in Germany by the use of the standard paper sizes worked out under the auspices of the national standardizing body, and widely adopted in that country and throughout continental Europe. The German Government Printing Office uses about 3,000,000 kilograms of standard size paper for official printed matter only. If the old paper sizes had been kept, the same amount of printing work would have required 3,300,000 kg., the saving being, consequently, 300,000 kg., (about 550,000 pounds), representing a money value of about 200,000 reichsmarks, (say, about \$50,000). However, as the German Government Printing Office furnishes but a little over one-tenth of all printed forms required by the German Federal and State authorities, a yearly saving of 2,000,000 marks, (\$500,000), through the use of the standard sizes is regarded as a conservative estimate.

A CAMPAIGN TO PREVENT WASTE

A 16-page booklet S.P.1840 entitled, "A Campaign to Prevent Waste," has recently been published by the Westinghouse Electric & Manufacturing Co. It tells, in a pictorial way, the methods and procedure employed by the Westinghouse Co. in the campaigns it has conducted against waste within its organization.

A great deal of enthusiasm is being shown by industrial men in the subject of waste elimination. Industries and utilities as a whole are rapidly coming to a realization of the worth-while savings that can be effected by systematically conducted campaigns for the elimination of waste.

MOST SHEATHING PAPERS FOUND EFFECTIVE

That most commercial sheathing papers perform sufficiently well their function of keeping out the cold air, provided the paper is properly put in place in the walls of buildings, is indicated by the results of tests recently reported by the Bureau of Standards on many different types of building papers. The tests of the permeability of building papers to air was made by means of a device designed to simulate the pressure of a 20-mile wind, and the air leakage through the paper under these conditions was measured with an ordinary gas meter.

Building papers, besides their use in weather-proofing walls have other important uses, such as protective coverings for materials on the job, for finished floors, and for fresh cement and concrete work, as lining for shipping cases, and as temporary roofing and shelters, so that the particular use to be made of the paper determines to a large extent the properties desired in it. For example, in a wall the paper should be air-tight and waterproof; as an outdoor protective

covering it should be strong, dry or wet, and water-proof; as a floor protection it should not have a sticky surface coating.

The papers were tested for such properties as weight, thickness, strength, water resistance, and permeability to air. Some were found to be fairly strong, others relatively weak. Some of the thin papers were stronger than some of the thicker ones. Most of the building papers which had been treated with weather-proofing materials, such as asphalt and paraffin, were rather resistant to air and water, although the water resistance of some was poor. Some which were fairly air-tight were not very strong and would require careful handling to get them in place without tearing.

STANDARD FITS FOR MASS PRODUCTION

That one of the most important standardization problems in the mechanical industry is the establishment of a national system of fits from which each

branch, unless its requirements are very special, may select the fits required for its particular purpose, is the opinion of John Gaillard, mechanical engineer, American Standards Association, as expressed in his article, Limited Gaging, which appeared in *The American Machinist*.

National standard systems of fits are established in 11 countries and are in development in 5 more. In his article the writer makes some comparisons, and analyzes some of the steps that must be covered to attain a universal system for all countries.

Standard fits are indispensable for mass production of interchangeable parts. Interchangeability may be required merely by the assembly of the component parts into the final product; by the necessity of replacing worn or broken parts; or by the fact that it must be possible to connect members of one group of objects to those belonging to another group, as, for example, in the case of taper-shank tools and the spindles of the machines in which they are to be used.



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STEAMBOAT INSPECTION SERVICE, DICKERSON N. HOOVER, Supervising Inspector General.

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RADIO DIVISION, W. D. TERRELL, Chief.

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